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(71) Applicant(s)

**Roke Manor Research Limited**  
(Incorporated in the United Kingdom)  
Roke Manor, ROMSEY, Hampshire, SO51 0ZN,  
United Kingdom

(72) Inventor(s)

**Walter Harold William Tuttlebee**

(74) Agent and/or Address for Service

**Derek Allen**  
Siemens Shared Services Limited, Intellectual  
Property Department, Siemens House, Oldbury,  
BRACKNELL, Berkshire, RG12 8FZ, United Kingdom

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(56) Documents Cited

EP 0770962 A2 WO 98/41948 A1 WO 96/03694 A1  
US 4902883 A

(58) Field of Search

UK CL (Edition Q) G4H HJ

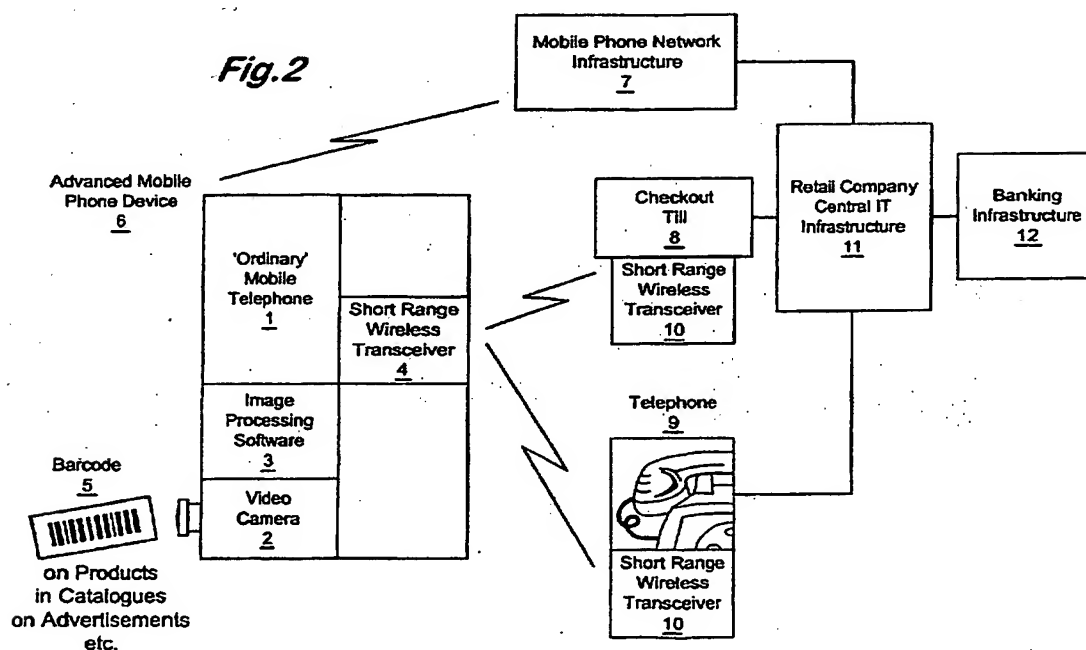
INT CL<sup>6</sup> G06K

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(54) Abstract Title

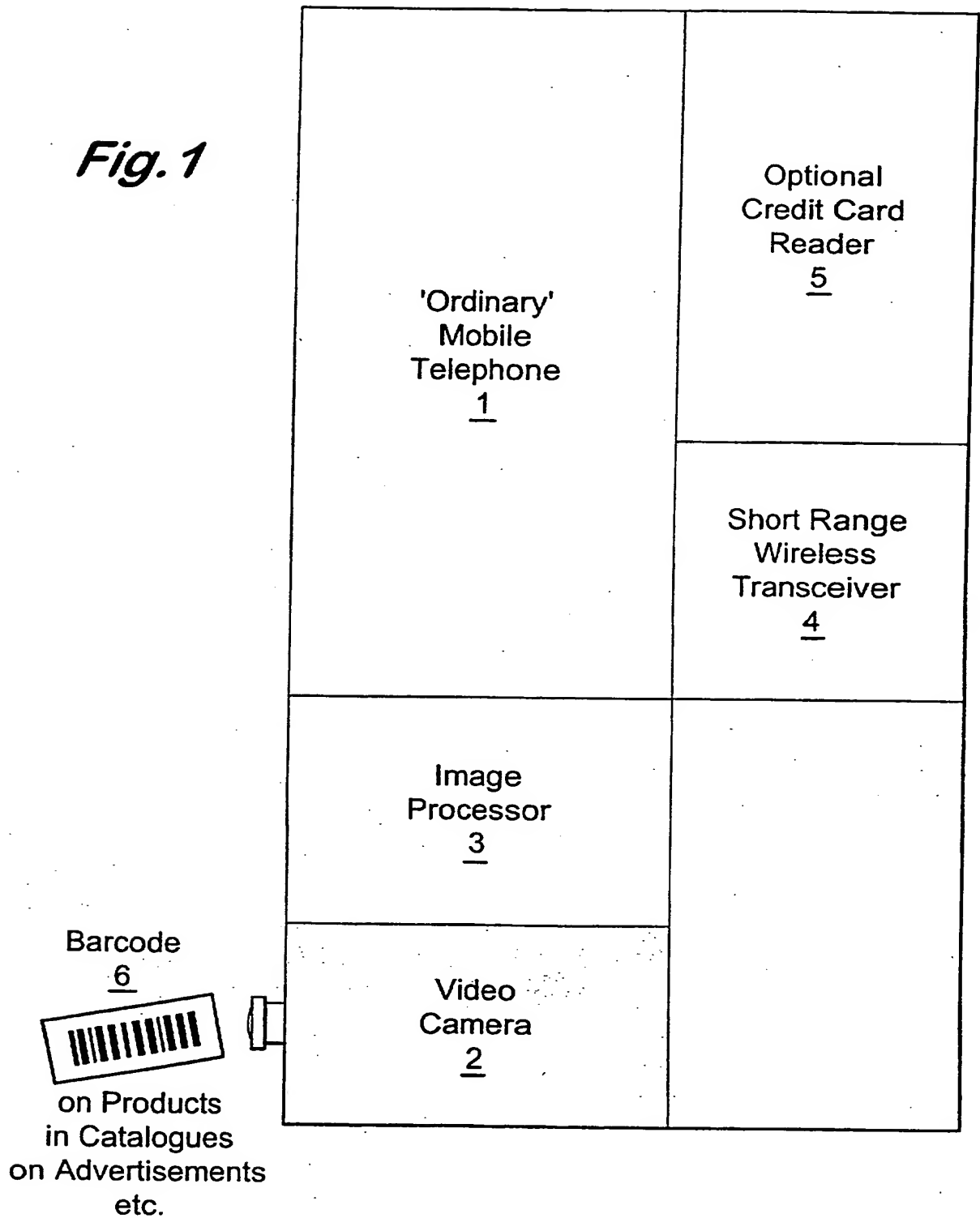
**Bar code readers**

(57) Bar code reader apparatus, e.g. a mobile phone 6, comprises a video camera 2, a processor and image processing software 3 responsive to signals from the camera for identifying the presence of a bar code in the field of view of the camera and for reading a product/service code represented thereby and a transmitter/receiver 4 arranged to communicate with a remotely located CPU 11 for the purpose of product/service identification as indicated in accordance with the product/service code as read.



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**Fig. 1**



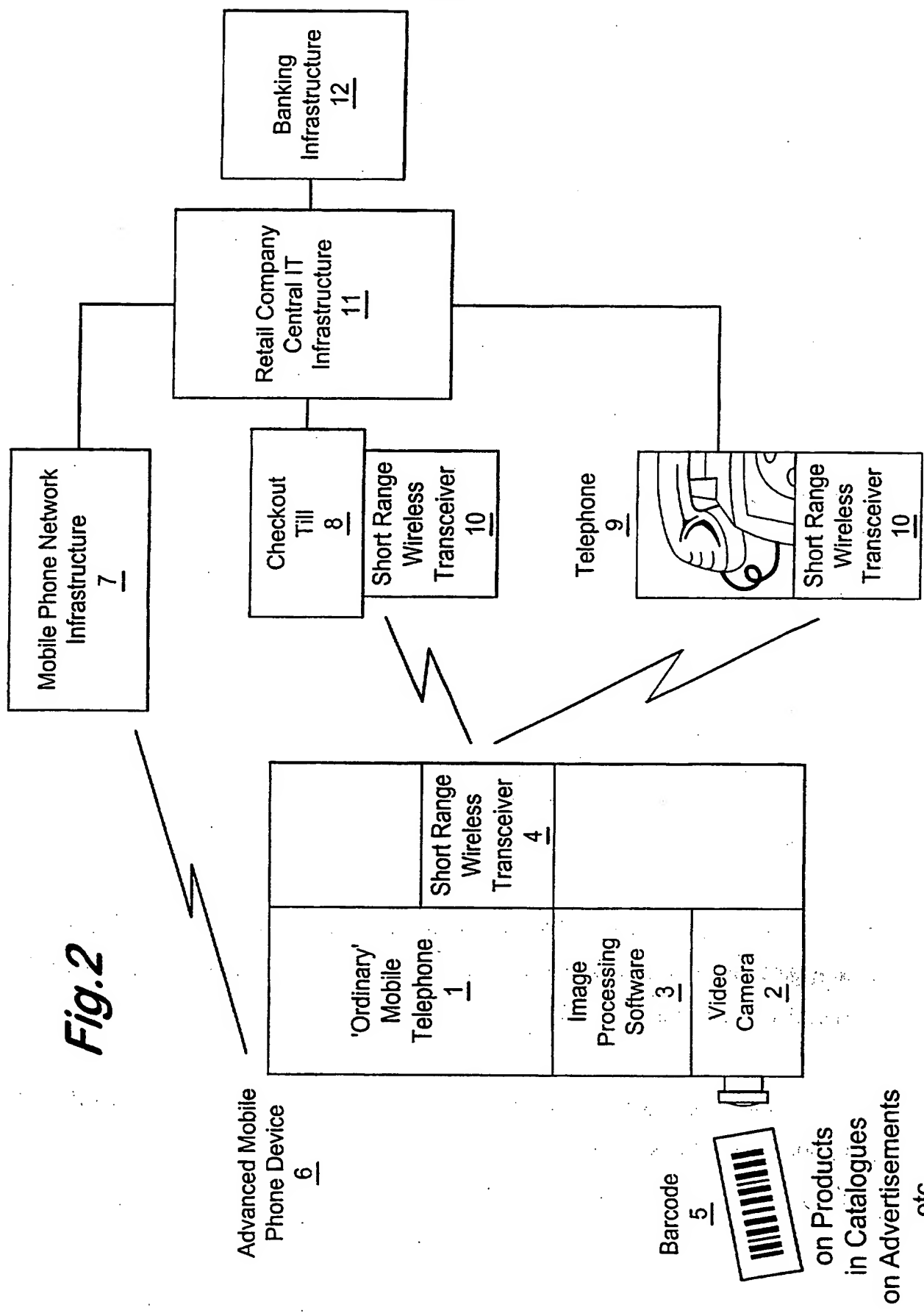


Fig.2

on Products  
in Catalogues  
on Advertisements  
etc.

## Improvements in or relating to bar code readers.

This invention relates to bar code reader apparatus and more especially but not exclusively it relates to cell phones or the like which afford a bar code reading facility.

The term 'cell phones or the like' when used herein is intended to include any radio telephone system such as a UMTS terminal, a GSM terminal, or an IS95 system for example, which are all very well known to those skilled in the art.

Bar codes are now universally used to label and identify almost all products. Accordingly it would be advantageous to include a bar code reading facility in cell phones (inter alia) to facilitate automated telephone ordering, to mention just one example. However, the additional cost of commonly used bar code reader apparatus and the space which it occupies can not always be justified. Moreover, even in applications where the consequential additional costs are justifiable, additional costs are always best avoided if at all possible in today's highly competitive markets.

It is an object of the present invention to provide cell phone apparatus or the like with a bar code reading facility without the need for a dedicated bar code reader.

According to the present invention as broadly conceived, bar code reader apparatus comprises a video camera, image processing software responsive to signals from the camera for

identifying the presence of a bar code in the field of view of the camera and for reading a product/service code represented thereby and a transmitter/receiver (tx/rx) arranged to communicate with a remotely located CPU for the purpose of product/service identification as indicated in accordance with the product/service code as read.

The said reader apparatus is preferably all contained within one housing. It is contemplated however that for some applications the image processing software may be stored and used remotely.

Although in accordance with this invention as broadly conceived, apparatus with which the video camera is operatively associated is not limited as regards its field of use, it is especially contemplated that the tx/rx is embodied in a cell phone or the like which in operation provides a communication link thereby to facilitate communication with the CPU.

The bar code reader apparatus may form a part of a cell phone or the like, which embodies the video camera, a data processor, which utilises the image processing software for bar code identification and reading purposes and a tx/rx integral with the cell phone or the like.

Since the new generation of cell phones or the like, are very likely to include a video camera, little additional hardware cost will be involved and no additional space will be required in order to provide a bar code reading facility, since this function will be

provided using an existing video camera and bar code recognition software.

The apparatus may also include a short range transmitter/receiver to provide for local communication.

The short range transmitter/receiver may use any kind of electromagnetic radiation, although conveniently it may be arranged to use an existing known communication protocol such as Bluetooth which operates in the ISM band at about 2.4GHz or IrDA for example.

A cell phone or the like having a video camera affording bar code reader facilities and a short range transmitter/receiver may be used for various applications. One such application is in a supermarket checkout system wherein a user reads the bar code data on each item as a shopping trolley is filled with selected items, and on completion of item selection, transfers this data, which is stored in a buffer in the cell phone, to a checkout using the short range transmitter/receiver.

As an extension of this supermarket application, the cell phone or the like may be arranged to include a payment card reader so that on completion of a shopping exercise, electronic payment is automatically effected and a user account debited consequent upon swiping of the users payment card.

It is envisaged that successful completion of this payment operation by the user may be automatically confirmed to the user,

by a bank which manages the user account, via the cell phone or the like, and then subsequently confirmed to the store till and or the supermarket exit alarms automatically via the short range transmitter/receiver, so that the user is allowed to leave the store with the shopping.

As a further extension of this supermarket payment system, the supermarket may provide a catalogue of available products, so that shopping can be done from home by a user, using a cell phone including a video camera, to read bar codes in the catalogue appertaining to required goods, and then down loading data derived therefrom using the cell phone or the like to the supermarket so that the ordered goods can be delivered, or assembled ready for collection.

A still further application, is for bar-codes to be printed with advertisements for goods, so that bar-coded data in an advertisement can be read from an advertisement by a user of a cell phone/video camera which data is then sent to a server, with supplementary data such as for example, delivery location, 'required by' time, and 'max. price', whereupon the server (which could be located on the cellular network, or provided by a third party, or on the Internet, for example) is arranged to respond by inviting the user to place an order with a selection of the most appropriate suppliers identified. Thus in accordance with this application the server may comprise a company which specialises in a particular product or range of products and which upon request, is able to chose the most appropriate product to meet each request taking specified user requirements into account.

One embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which;

Figure 1, is a somewhat schematic block diagram of bar code reading apparatus which embodies a cell phone or the like, and;

Figure 2, is a generally schematic block diagram of a supermarket checkout system which includes the apparatus of Figure 1.

Referring now to Figure 1, bar code reader apparatus comprises a mobile telephone 1, which in this example comprises a UMTS terminal but which may be any kind of cell phone or the like, a video camera 2, of the kind now becoming available in telephone apparatus, a processor 3, which uses image processing software, a short range transmitter/receiver 4, and an optional credit or prepayment card reader 5. Although in this arrangement the image processing software, is locally stored, in an alternative arrangement the image processing software may be arranged to reside in the cell phone network infrastructure.

In use of the apparatus, a bar code 6, is viewed by the video camera 2, and resultant signals are processed in the image processor for bar code recognition purposes and may be transferred via a mobile telephone network infrastructure 7, as shown schematically in Figure 2, for processing.

Referring now to Figure 2, in one application of the apparatus to supermarket checkouts, a user uses the video camera



6 to view the bar codes of items selected to be purchased as a supermarket trolley is filled, thereby automatically and progressively totalling a bill as the trolley is filled during a tour of the supermarket. The user may then transfer this information to a checkout till 8, using the short range wireless link 4, to communicate with a transceiver 10, operatively associated with the till 8, using any suitable transmission protocol (e.g. Bluetooth, IrDA, etc.), thereby speeding up the checkout process.

As an extension of this, a user could pay for a trolley load of shopping electronically using his/her cell phone terminal and the mobile telephone network 7, by effecting a direct electronic funds transfer from his/her bank account to that of the retail chain concerned. This may be done using the card reader 5, to read the user's bank / credit cards, or by means of authorisation based upon a user's unique cell phone identity (e.g. in GSM, using the subscriber identity module). A payment confirmation would be sent to the phone from the bank, which is then communicated via the short range wireless transceiver 4, to the transceiver 10, at the checkout till 8, and/or to the shop exit alarms, which then allow the user to simply wheel out his/her full, paid-for, trolley load of shopping. Such payment confirmation could alternatively be routed from a banking infrastructure 12, to the retail chain central IT infrastructure 11, following the normal methods for payment authorisation, and also to the checkout/exits as already explained herein. It will be apparent that this application allows reductions in the need for checkout tills and staff.

As an extension of the above, the supermarket could provide a catalogue of its goods so that customers could 'upload'

shopping lists from home. This could be done by a customer using the apparatus to 'scan in' bar-codes from the catalogue using the video camera 2, and then upload it via the cell phone network to the shop.

Alternatively, the apparatus could use the short range wireless link 4, 10, to communicate with a normal wired telephone 9, and use the normal wired telephone network to communicate with the retail company's central IT infrastructure 11. The ordered shopping could then either be delivered by the shop to a shopper's home or kept for collection, depending upon the shopper's preference. This is in effect a much more user friendly variant of internet shopping, since a customer can do it whilst sitting in a lounge at home or wandering the house, rather than having to sit in front of a personal computer terminal ! A user could also use a cell phone/video camera at home, to scan bar codes on products in the larder which are running low, so as progressively to compile a list which is stored in the cell phone, to be used when convenient for placing a grocery order.

An extension of the above, not directly related to retail food shopping, is for bar-codes for goods to be printed in advertisements. Having 'scanned' the bar code using the video camera 2, a user presses a button to send this information to a server, together with, delivery location, 'required by' time, and 'max. price'. The server (which could be located on the cellular network, or provided by a third party, or on the Internet, for example) might respond by inviting the user to place an order with a selection of the most appropriate suppliers identified.

## CLAIMS.

1. According to the present invention bar code reader apparatus comprises a video camera, a processor and image processing software responsive to signals from the camera for identifying the presence of a bar code in the field of view of the camera and for reading a product/service code represented thereby and a transmitter/receiver (tx/rx) arranged to communicate with a remotely located CPU for the purpose of product/service identification as indicated in accordance with the product/service code as read.
2. Apparatus as claimed in Claim 1, all contained within one housing and arranged for communication with the remotely located CPU.
3. Apparatus as claimed in Claim 2, wherein the tx/rx is embodied in a cell phone or the like which in operation provides a communication link thereby to facilitate communication with the CPU.
4. Apparatus as claimed in Claim 3, wherein the bar code reader apparatus forms an integral part of a cell phone or the like, which embodies the video camera, a data processor, which utilises the image processing software for bar code identification and reading purposes and a tx/rx.
5. Apparatus as claimed in Claim 4, including a short range transmitter/ receiver which provides for local communication.
6. Apparatus as claimed in Claim 5, wherein the short range transmitter/receiver uses an existing known communication protocol.

7. Apparatus as claimed in Claim 6, wherein the protocol used is Bluetooth which operates in the ISM band at about 2.4GHz

8. 7. Apparatus as claimed in Claim 6, wherein the protocol used is IrDA.

9. A supermarket checkout system including apparatus as claimed in any of Claims 5 to 8, wherein a user reads bar code data on each item as a shopping trolley is filled with selected items, and on completion of item selection, transfers this data, which is stored in a buffer in the cell phone, to a checkout terminal using the short range transmitter/receiver.

10. A supermarket checkout system including apparatus as claimed in any of Claims 5 to 9 including a payment card reader so that on completion of a shopping exercise, electronic payment is automatically effected and a user account debited consequent upon the swiping of the users payment card.

11. A supermarket checkout system including apparatus as claimed in Claim 10, wherein successful completion of this payment operation by the user is automatically confirmed to the user, by a bank which controls the user account, via the cell phone or the like, and then subsequently confirmed to the store till and or the supermarket exit alarms automatically via the short range transmitter/receiver, so that the user is allowed to leave the store with his shopping.

12. A home shopping system, including apparatus as claimed in any of claims 1 to 8, wherein a store provides a catalogue of available products, so that shopping can be done from home, by a user, using the video camera, to read bar codes in the catalogue appertaining to required goods, and then down loading data derived therefrom using the cell phone or the like to the store so

that the ordered goods can be delivered, or assembled ready for collection.

13. A system for ordering goods from printed advertisements, comprising apparatus as claimed in any of claims 1 to 8, wherein bar-codes are printed with advertisements for goods, so that bar-coded data in an advertisement can be read from an advertisement using the video camera, which data is then sent to a server, with supplementary data, whereupon the server is arranged to respond by inviting the user to place an order with a selection of the most appropriate suppliers identified.

14. Apparatus as claimed in any of Claims 1 to 8, and substantially as herein before described with reference to the accompanying drawings.

15. A system as claimed in any of Claims 9 to 13, and substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9925260.3  
Claims searched: 1-15

Examiner: Mike Davis  
Date of search: 10 December 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): G4H (HJ)

Int Cl (Ed.6): G06K

Other: Online: WPI, EPODOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0770962 A2 (SYMBOL TECHNOLOGIES)	-
A	WO 98/41948 A1 (WYMAN)	-
A	WO 96/03694 A1 (PSC)	-
A	US 4902883 (POLAND)	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.